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TEMPERATURE REGULATING DEVICE FOR NC HYDRAULIC UNIT

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TEMPERATURE REGULATING DEVICE FOR NC HYDRAULIC UNIT

[NC yuatsu yunitto no ondo chosetsu sochi]

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Applicant: Hitachi Zosen Corporation

[There are no amendments to this patent.]

Claim

1. In a device provided with an oil temperature sensor that functions to drive a cooling fan when the oil temperature in a conduit system and oil tank, between which the cooling fan is installed, goes above a fixed temperature, an oil temperature sensor that functions to stop the machinery when the oil temperature rises or falls, and a machine control panel, a temperature regulating device for NC hydraulic unit characterized in having an oil temperature sensor that is connected to the electrical control panel for oil temperature regulation through an oil temperature setting regulator, and that functions to operate a solenoid switch for the heater in the aforementioned electrical control panel for oil temperature regulation that supplies power to the heater in the tank until the oil temperature in the oil tank reaches a set temperature, and an oil temperature sensor that functions when the oil temperature rises abnormally to operate an abnormal temperature relay in the aforementioned electrical control panel for oil temperature regulation and produce an alarm.

Detailed explanation of the design

The present design relates to a device that regulates the temperature of the oil in an NC hydraulic unit. /2

The working oil in a hydraulic device works as the medium of power transmission, as well as a lubricant for the various parts and machine sliding. In this case, the most important property

required for the working oil is the viscosity of the oil itself. Therefore, it is desirable that the usage temperature be regulated correctly.

The present design was devised with the objective of providing a device that meets this demand. Below, it is explained based on figures that illustrate an application example thereof.

(1) is an NC machine, (2) is a working oil storage container, that is, an oil tank, connected to said NC machine (1) by conduits (3) and (4). Pressurized oil supplied to NC machine (1) from said oil tank (2) through conduit (3) drives an electric hydraulic pulse motor in the machine. (5) is a pump to supply the oil in aforementioned oil tank (2) to NC machine (1), and it is driven by motor (6). (7) and (8) are radiators placed within aforementioned conduit (4). Oil that passes /3
through there is cooled by heat exchange with air pumped through by fans (11) and (12) that are run by fan motors (9) and (10). (13) is a machine control panel furnished with a solenoid valve (MC_2) for aforementioned motor (6) and a solenoid valve (MC_1) for aforementioned fan motors (9) and (10), and it is also connected to oil temperature sensors (14), (15) and (16) furnished in oil tank (2). For example, aforementioned oil temperature sensor (14) senses when the oil temperature in oil tank (2) is above 40°C, operates solenoid valve (MC_1) for the fan motors in machine control panel (13), and drives radiators (7) and (8), and fan motors (9) and (10) for cooling. And aforementioned oil temperature sensor (15) senses whether the oil temperature in oil tank (2) is above 65°C, for example, and oil temperature sensor (16) senses when the same oil temperature is below 30°C, for example, so that signals are output to an automatic operation stop circuit in machine control panel (13) and automatic operation of NC machine (1) is stopped.

Note that oil temperature sensors (17) and (18) and a heater (19) are furnished in oil tank (2). Aforementioned oil temperature sensor (17) is connected to oil temperature sensor (18) and heater (19), as well as to electrical control panel (21) for oil temperature regulation, through /4
a temperature setting regulator (20) installed at the side of oil tank (2).

Therefore, the oil temperature in oil tank (2) is sensed by aforementioned oil temperature sensor (17), solenoid valve (MC_3) for the heater in electrical control panel (21) for oil temperature regulation is operated and oil is heated until the oil temperature reaches 40°C, for example, which is set by oil temperature regulator (20). When the oil temperature in oil tank (2) rises abnormally (50°C, for example), the temperature is sensed by aforementioned oil temperature sensor (18), electrical control panel (21) for oil temperature regulation is instructed of this, and an abnormal oil temperature relay (MC_4) in said control panel (21) is operated to produce an alarm.

Note that Figure 2 shows an example of the electrical circuitry in this design and is furnished with a 24-hour timer (TM). This is a consideration so that normal operation of the machine is possible immediately when work is started in the winter. If the time work starts is 8 o'clock, for example, a switch is automatically activated at 7 o'clock so that the oil is /5

correctly preheated. At times when preheating of the oil is not necessary, such as in summer, the timer can be taken out of use by setting the changeover switch to the summer side. Note that (22) in the figure is a snap switch to activate and stop fan motors (9) and (10) for cooling, (23) is an indicator lamp indicating that there is power to heater (19), (24) is a rotary indicator lamp indicating that the oil temperature has risen abnormally, and (25) is a reset switch to cancel the alarm with cooling after an abnormal oil temperature rise.

The present design, as explained for the application example above, is furnished with an oil temperature sensor (17) that is connected to electrical control panel (21) for oil temperature regulation through oil temperature regulator (20) and functions to operate a solenoid valve for a heater in aforementioned electrical control panel (21) for oil temperature regulation and supplies power to heater (19) in oil tank (2) until the oil temperature in oil tank (2) reaches a set temperature, and an oil temperature sensor that functions to operate an abnormal oil temperature relay in aforementioned electrical control panel (21) for oil temperature regulation and produce an alarm when the oil temperature in the tank rises abnormally. By combining and operating in conjunction with existing devices, the oil temperature in the tank can be regulated automatically, as well as accurately and correctly.

Brief description of the figures /6

Figure 1 is a block diagram of a device illustrating an application example of the present design, and Figure 2 shows an example of the electrical circuitry.

(1) is an NC machine, (2) an oil tank, (7) and (8) radiators, (11) and (12) cooling fans, (13) a machine control panel, (14), (15), (16), (17) and (18) oil temperature sensors, (19) a heater, (20) an oil temperature setting regulator, and (21) an electrical control panel for oil temperature regulation.

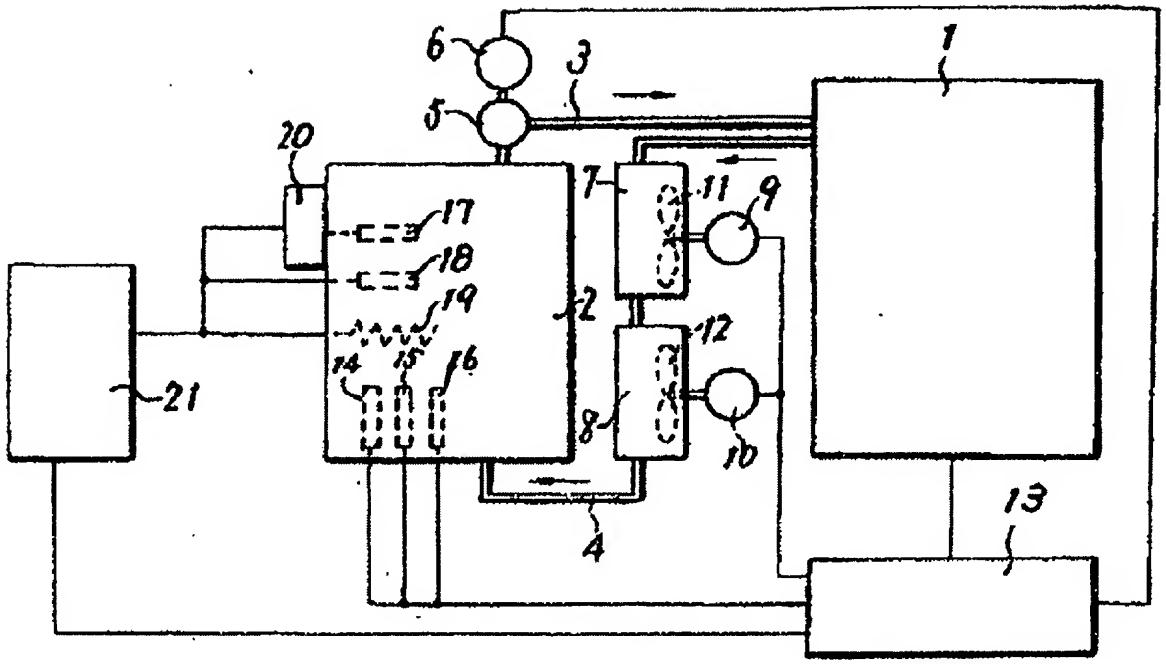

Figure 1

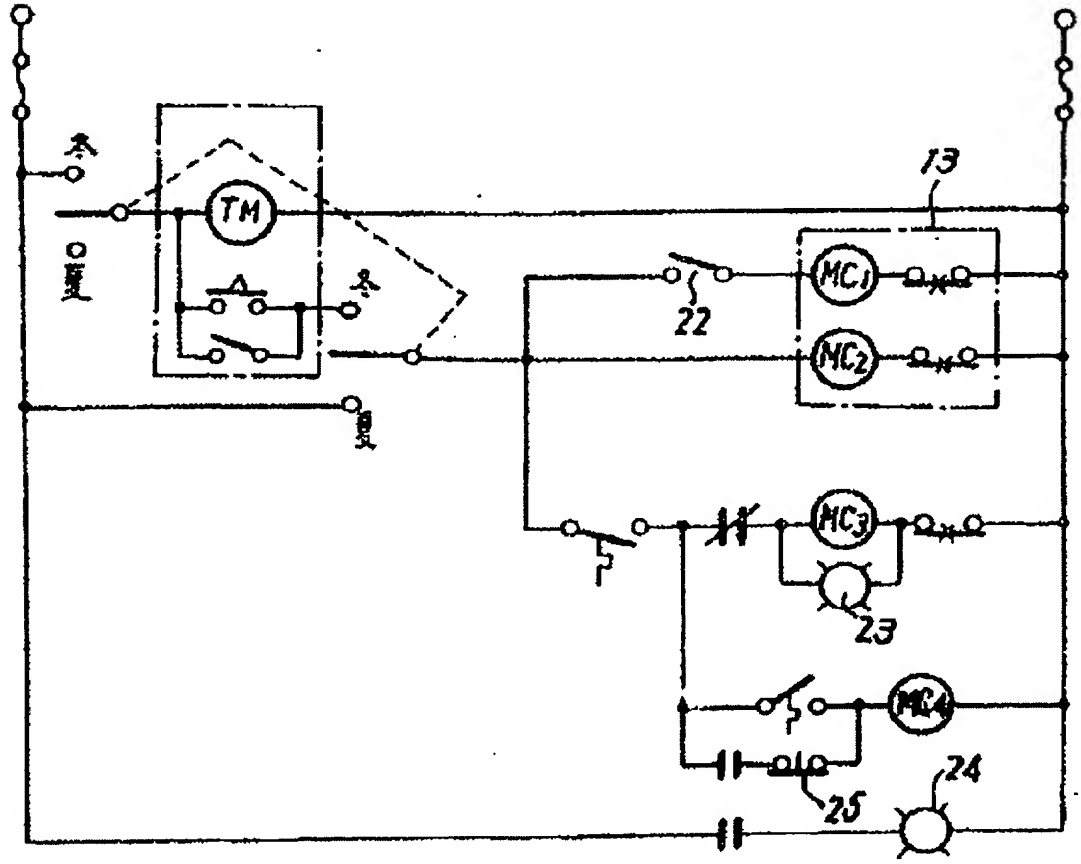

Figure 2